IN THE CLAIMS:

Please amend claims 11, 19, and 24 as follows. Please cancel claim 23 without prejudice or disclaimer. Please add new claim 25 as follows.

1. (Previously Presented) A method, comprising:

estimating interference from a received signal at a first observation time, creating a first covariance matrix on the basis of the estimation and defining an inverse matrix of the first covariance matrix and a Cholesky decomposition matrix;

removing selected covariance components from the Cholesky decomposition matrix;

computing the inverse of a sub-matrix, which represents the common part of the first covariance matrix and a second covariance matrix, which includes covariance estimates of a second observation time, by using the aid of the Cholesky decomposition of the inverse matrix of the first covariance matrix;

estimating interference from a received signal at the second observation time and determining additional covariance components on the basis of the estimation;

creating the Cholesky decomposition of the inverse matrix of the second covariance matrix by using unitary rotations; and

generating an output value of the channel equalizer by utilizing information obtained with the aid of the Cholesky decomposition of the inverse matrix of the second covariance matrix.

2. (Previously Presented) The method of claim 1, further comprising filtering additional covariance components.

3. (Original) The method of claim 1, further defining the Cholesky decomposition of the inverse matrix of the first covariance matrix of the form $\mathbf{W}_p = \begin{pmatrix} \omega_p & \bar{\mathbf{0}}^H \\ \boldsymbol{\omega}_p & \boldsymbol{\Omega}_p \end{pmatrix}$,

where ω_p is a scalar, $\boldsymbol{\omega}_p$ is a vector, $\bar{\mathbf{0}}^H$ is a zero vector and $\boldsymbol{\Omega}_p$ is a lower triangular sub-matrix.

4. (Previously Presented) The method of claim 1, further comprising partitioning the inverse matrix of the first covariance matrix as $\mathbf{U}(n) = \begin{pmatrix} u_p & \mathbf{u}_p^H \\ \mathbf{u}_p & \mathbf{U}_p \end{pmatrix}$,

wherein u_p is a scalar, $\mathbf{u}_p$ is a vector, $\mathbf{u}_p{}^H$ is a complex-conjugate transpose vector, $\mathbf{U}_p$ is a sub-matrix and H is a complex-conjugate transpose matrix.

5. (Original) The method of claim 1, wherein the selection of the covariance components to be removed is based on the size of the sliding step of a signal window.

6. (Previously Presented) The method of claim 1, further comprising determining additional covariance components as

$$\begin{pmatrix} \boldsymbol{\sigma}_f \\ \sigma_f \end{pmatrix} = \left(H(n)\left[diag\left(1-\hat{b}^2(n)\right)\right]H^H(n) + I\delta_0^2\right)\begin{pmatrix} \mathbf{0} \\ 1 \end{pmatrix},$$

wherein $\boldsymbol{\sigma}_f$ is covariance component vector, σ_f is a covariance component located in the corner of the second covariance matrix, H(n) is a system matrix in the observation time of the second covariance matrix, diag is a diagonal matrix, $\hat{b}(n)$ is a symbol estimate, H is a complex conjugate matrix, σ_0^2 is the noise variance, and I is an interference matrix.

7. (Previously Presented) The method of claim 1, further comprising defining the computation of the inverse of the sub-matrix $\overline{\Sigma}$ representing the common part of the two consecutive covariance matrices with the aid of determination $\overline{\Sigma}^{-1} = \overline{\boldsymbol{\Omega}\boldsymbol{\Omega}}^H$, wherein $\overline{\boldsymbol{\Omega}}$ is a sub-matrix and $\overline{\boldsymbol{\Omega}}^H$ is a complex-conjugate transpose of the sub-matrix.

8. (Previously Presented) The method of claim 1, further comprising defining Cholesky factorisation of the inverse matrix of the second covariance matrix as

$$\mathbf{W}_f = \begin{pmatrix} \overline{\boldsymbol{\Omega}} & -\sqrt{u_f}\,\overline{\boldsymbol{\Omega}\boldsymbol{\Omega}}^H\sigma_f \\ \overline{\mathbf{o}}^H & \sqrt{u_f} \end{pmatrix}\Theta,$$

wherein $\overline{\boldsymbol{\Omega}}$ is a sub-matrix, $\overline{\mathbf{o}}^H$ is a zero vector, $\overline{\boldsymbol{\Omega}}^H$ is a complex-conjugate transpose of the sub-matrix, $u_f = \left(\sigma_f - \boldsymbol{\sigma}_f^H\overline{\Omega\Omega}^H\boldsymbol{\sigma}_f\right)$, σ_f is a covariance component, Θ is a series of unitary rotations and H is a complex-conjugate transpose matrix.

9. (Original) The method of claim 1, wherein an output signal of an equalizer is generated as follows:

$$z_k(n) = \beta_k(n)\left(\alpha_k(n)\hat{b}_k(n) + \eta_k^H(n)\mathbf{W}_f^H\tilde{\mathbf{r}}(n)\right)$$

wherein $\alpha_k(n) = \eta_k^H(n)\eta_k(n)$, $\eta_k(n) = \mathbf{W}_f^H\mathbf{h}_k(n)$, $\beta_k(n) = 1 - \dfrac{\alpha_k(n)}{\alpha_k(n) + \left|\hat{b}_k(n)\right|^{-2}}$, $\mathbf{h}_k(n)$ is a channel response vector, n is an nth symbol, H is a complex-conjugate transpose matrix, $\hat{b}_k\,(n)$ is a symbol estimate based on a channel decoder feedback,

$\mathbf{W}_f = \begin{pmatrix} \overline{\mathbf{\Omega}} & -\sqrt{u_f}\,\overline{\mathbf{\Omega}\mathbf{\Omega}}^H\sigma_f \\ \overline{\mathbf{0}}^H & \sqrt{u_f} \end{pmatrix}\Theta$ wherein $\overline{\mathbf{\Omega}}$ is a sub-matrix, $\overline{\mathbf{0}}^H$ is a zero vector, $\overline{\mathbf{\Omega}}^H$ is a complex-conjugate transpose of the sub-matrix, $u_f = \left(\sigma_f - \boldsymbol{\sigma}_f^H\overline{\Omega\Omega}^H\boldsymbol{\sigma}_f\right)$, σ_f is a covariance component, Θ is a series of unitary rotations and H is a complex-conjugate transpose matrix, $\tilde{\mathbf{r}}(n) = \mathbf{r}(n) - \mathbf{H}\hat{\mathbf{b}}$ where $\mathbf{H}_k(n)$ is a channel response matrix and n means an nth symbol.

10. (Original) The method of claim 1, wherein the output value of the channel equalizer is generated by further utilizing a-priori symbol estimate information.

11. (Currently Amended) An apparatus, comprising:

~~an estimating unit~~ a first estimator configured to estimate interference from a received signal at a first observation time, create a first covariance matrix on the basis of

the estimation and define an inverse matrix of the first covariance matrix and a Cholesky decomposition matrix;

~~a removing unit~~ a remover configured to remove selected covariance components from the Cholesky decomposition matrix;

~~a computing unit~~ a processor configured to compute the inverse of a sub-matrix, which represents the common part of the first covariance matrix and a second covariance matrix, which includes covariance estimates of a second observation time, by using the aid of the Cholesky decomposition of the inverse matrix of the first covariance matrix;

~~an estimating unit~~ a second estimator configured to estimate interference from a received signal at the second observation time and determine additional covariance components on the basis of the estimation;

~~a creating unit~~ a creator configured to create the Cholesky decomposition of the inverse matrix of the second covariance matrix by using unitary rotations; and

~~a generating unit~~ a first generator configured to generate an output value of the channel equalizer by utilizing information obtained with the aid of the Cholesky decomposition of the inverse matrix of the second covariance matrix.

12. (Previously Presented) The apparatus of claim 11, wherein the Cholesky decomposition of the inverse matrix of the first covariance matrix is of the form

$$\mathbf{W}_p = \begin{pmatrix} \omega_p & \bar{\mathbf{0}}^H \\ \boldsymbol{\omega}_p & \boldsymbol{\Omega}_p \end{pmatrix},$$

where ω_p is a scalar, $\boldsymbol{\omega}_p$ is a vector, $\bar{\mathbf{0}}^H$ is a zero vector and $\boldsymbol{\Omega}_p$ is a lower triangular sub-matrix.

13. (Previously Presented) The apparatus of claim 11, wherein the inverse matrix of the first covariance matrix is partitioned as $\mathbf{U}(n) = \begin{pmatrix} u_p & \mathbf{u}_p^H \\ \mathbf{u}_p & \mathbf{U}_p \end{pmatrix}$,

wherein u_p is a scalar, $\mathbf{u}_p$ is a vector, $\mathbf{u}_p{}^H$ is a complex-conjugate transpose vector, $\mathbf{U}_p$ is a sub-matrix and H is a complex-conjugate transpose matrix.

14. (Previously Presented) The apparatus of claim 11, wherein the selection of the covariance components to be removed is based on the size of the sliding step of the signal window.

15. (Previously Presented) The apparatus of claim 11, wherein additional covariance components are determined as $\begin{pmatrix} \boldsymbol{\sigma}_f \\ \sigma_f \end{pmatrix} = \left(H(n)\left[diag\left(1-\hat{b}^2(n)\right)\right]H^H(n) + I\delta_0^2\right)\begin{pmatrix} \mathbf{0} \\ 1 \end{pmatrix}$,

wherein $\boldsymbol{\sigma}_f$ is covariance component vector, σ_f is a covariance component located in the corner of the second covariance matrix, H(n) is a system matrix in the observation time of the second covariance matrix, diag is a diagonal matrix, $\hat{b}(n)$ is a symbol estimate, H is a complex conjugate matrix, σ_0^2 is the noise variance, and I is an interference matrix.

16. (Previously Presented) The apparatus of claim 11, wherein the computation of the inverse of the sub-matrix $\overline{\Sigma}$ representing the common part of the two consecutive covariance matrices is defined with the aid of determination $\overline{\Sigma}^{-1} = \overline{\mathbf{\Omega}}\overline{\mathbf{\Omega}}^{H}$, wherein $\overline{\mathbf{\Omega}}$ is a sub-matrix and $\overline{\mathbf{\Omega}}^{H}$ is a complex-conjugate transpose of the sub-matrix.

17. (Previously Presented) The apparatus of claim 11, wherein Cholesky factorisation of the inverse matrix of the second covariance matrix is defined as

$$\mathbf{W}_f = \begin{pmatrix} \overline{\mathbf{\Omega}} & -\sqrt{u_f}\,\overline{\mathbf{\Omega}}\overline{\mathbf{\Omega}}^{H}\sigma_f \\ \overline{\mathbf{0}}^{H} & \sqrt{u_f} \end{pmatrix}\Theta,$$

wherein $\overline{\mathbf{\Omega}}$ is a sub-matrix, $\overline{\mathbf{0}}^{H}$ is a zero vector, $\overline{\mathbf{\Omega}}^{H}$ is a complex-conjugate transpose of the sub-matrix, $u_f = \left(\sigma_f - \boldsymbol{\sigma}_f^{H}\overline{\Omega}\overline{\Omega}^{H}\boldsymbol{\sigma}_f\right)$, σ_f is a covariance component, Θ is a series of unitary rotations and H is a complex-conjugate transpose matrix.

18. (Previously Presented) The apparatus of claim 11, wherein an output signal of an equalizer is generated as $z_k(n) = \beta_k(n)\left(\alpha_k(n)\hat{b}_k(n) + \eta_k^{H}(n)\mathbf{W}_f^{H}\tilde{\mathbf{r}}(n)\right)$,

wherein $\alpha_k(n) = \eta_k^{H}(n)\eta_k(n)$, $\eta_k(n) = \mathbf{W}_f^{H}\mathbf{h}_k(n)$, $\beta_k(n) = 1 - \dfrac{\alpha_k(n)}{\alpha_k(n) + \left|\hat{b}_k(n)\right|^{-2}}$, $\mathbf{h}_k(n)$ is a channel response vector, n is an nth symbol, H is a complex-conjugate transpose matrix, $\hat{b}_k(n)$ is a symbol estimate based on a channel decoder feedback,

$\mathbf{W}_f = \begin{pmatrix} \overline{\mathbf{\Omega}} & -\sqrt{u_f}\overline{\mathbf{\Omega\Omega}}^H\sigma_f \\ \overline{\mathbf{o}}^H & \sqrt{u_f} \end{pmatrix}\Theta$ wherein $\overline{\mathbf{\Omega}}$ is a sub-matrix, $\overline{\mathbf{o}}^H$ is a zero vector, $\overline{\mathbf{\Omega}}^H$ is a complex-conjugate transpose of the sub-matrix, $u_f = \left(\sigma_f - \boldsymbol{\sigma}_f^H \overline{\Omega\Omega}^H \boldsymbol{\sigma}_f\right)$, σ_f is a covariance component, Θ is a series of unitary rotations and H is a complex-conjugate transpose matrix, $\tilde{\mathbf{r}}(n) = \mathbf{r}(n) - \mathbf{H}\hat{\mathbf{b}}$ where $\mathbf{H}_k(n)$ is a channel response matrix and n means an nth symbol.

19. (Currently Amended) The apparatus of claim 11, further comprising a ~~generating unit~~ second generator configured to generate the output value of the channel equalizer by further utilizing a-priori symbol estimate information.

20-23. (Cancelled)

24. (Currently Amended) ~~A~~ An apparatus comprising:

first estimating means for estimating interference from a received signal at a first observation time, creating a first covariance matrix on the basis of the estimation and defining an inverse matrix of the first covariance matrix and a Cholesky decomposition matrix;

removing means for removing selected covariance components from the Cholesky decomposition matrix;

computing means for computing the inverse of a sub-matrix, which represents the common part of the first covariance matrix and a second covariance matrix, which includes covariance estimates of a second observation time, by using the aid of the Cholesky decomposition of the inverse matrix of the first covariance matrix;

second estimating means for estimating interference from a received signal at a second observation time and determining additional covariance components on the basis of the estimation;

creating means for creating the Cholesky decomposition of the inverse matrix of the second covariance matrix by using unitary rotations; and

generating means for generating an output value of the channel equalizer by utilizing information obtained with the aid of the Cholesky decomposition of the inverse matrix of the second covariance matrix.

25. (New) A computer program, embodied on a computer-readable medium, configured to control a processor to implement a method, the method comprising:

estimating interference from a received signal at a first observation time, creating a first covariance matrix on the basis of the estimation and defining an inverse matrix of the first covariance matrix and a Cholesky decomposition matrix;

removing selected covariance components from the Cholesky decomposition matrix;

computing the inverse of a sub-matrix, which represents the common part of the first covariance matrix and a second covariance matrix, which includes covariance estimates of a second observation time, by using the aid of the Cholesky decomposition of the inverse matrix of the first covariance matrix;

estimating interference from a received signal at the second observation time and determining additional covariance components on the basis of the estimation;

creating the Cholesky decomposition of the inverse matrix of the second covariance matrix by using unitary rotations; and

generating an output value of the channel equalizer by utilizing information obtained with the aid of the Cholesky decomposition of the inverse matrix of the second covariance matrix.